UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
TRUONG, LECHI

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _02 December 2008_.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _17-22_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _17-22_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
        1.☐ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

1.   Claims 17-22 are presented for the examination. Claims 1-16 are cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   **Claims 17, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Leach US (5, 745764) in view of Coplien(US 5093914 A).

3.   **As to claim 17** , Leach teaches the invention substantially including: implementing an

interface(implements the interface, col 6, ln 1-5), accessing in a class an object oriented

programming environment(col 4, ln 14-20), a first interface D(the IC interface, col 13, ln 63-

67/the IBasic, col 8, ln 5-10/ D interface, col 14, ln 15-20), a second interface E(the ID interface,

col 13, ln 63-67/ IDatabase interface, col 8, ln 5-10/ C interface, col 14, ln 15-20), a class G(

class S1, col 13, ln 63-67/ col 14, ln 5-10), a class S1 configured to implement interface D and

interface C(col 13, ln 64-67), a first function G1(virtual function defined for the IBasic

interface, col 27, ln 60-63, Fig. 8/ virtual function defined for C interface, col 14, ln 15-17), a

first function G1 that is member of class G and a member of interface D(col 14, ln 15-17/ col 6,

ln 55-65), a second function G2(virtual functions defined for C interface[not a member of

interface E], col 14, ln 15-17, Fig. 4, the virtual functions defined for the IBasic interface , col

27, ln 62-65/ C:: AddEef, Fig. 4/ B:: AddRef 811, Fig. 8), a second function G2 that is a

member of class G and a member of interface D but not a member of interface E(col 14, ln 15-

17/ col 27, ln 62-65 / col 13, ln 62-67/ Fig. 8), a third function G3(virtual functions defined for D

interface[not member of interface D], col 14, ln 15-20/ virtual functions defined for the IPrint

interface, col 27, ln 62-65), a third function G3 that is a member of class G and a member of

interface E but not a member of interface D(col 14, ln 15-17/ col 27, ln 62-65/ col 13, ln 62-67/

Fig. 8), a first interface vtable G.D(virtual function table 803, col 27, ln 55-56/virtual function

table 403A, col 14, ln 15-20), a first interface vtable G.D comprising a fist pointer configured to

point to function G1 and a second pointer configured to point to function G2(col 27, ln 53-56/

ln 60-62/ col 14, ln 15-20/ Fig, 8), a second interface vtable G.E (virtual table 804, col 27, ln 58-

59/ virtual function table 205, col 8, ln 10-15/ virtual function table 403, col 14, ln 14-20), a

fourth pointer(the virtual table pointer within data member m-P, S1::P::vfptr points(col 27, ln

56-58) , function G2(the virtual function defined for IPrin interface, col 27, ln 62-65), the

fourth pointer configured to point to function G3(col 27, ln 56-58/ ln 62-65/ col 14, ln 15-20/ the

S1::P::vfptr pointer points to the vtable 840 which points to the function G3/ Fig. 8), an object(

method, col 27, ln 40-41), an object , the object being an instance of class G(col 27, ln 40-41),

object is of type D corresponding to vtables G.D for a function and function G2 , object is of

type E for vtable G.E for a function and function G3 (virtual function table 403 contains pointer

to the virtual functions defined for the C interface, and virtual function table 403A contains

pointers to the virtual functions defined for D interface, col 14, ln 15-20).

4.   Leach teaches object is of type D corresponding to vtable G.D which points to the

function and G2, object is of type E corresponding to vtable G.E which points to a function and

G3(col 14, ln 15-20)[vtabe G.D and vtable G.E are represented for a virtual function table].

Leach does not teach based on each type of object to select the vtable which is used during

runtime to connect to the functions, at compile time, a compiler is to generate the table that

indicate an index for each function to be determined base on definition of class, the vtable G.E

comprising a third pointer points to the function G1 which is pointed by the first pointer of vtable

G.D (both the vtable G.D and vtable G.E point to the function G1). However, Coplien teaches

based on each type of object to select the vtable which is used during runtime to connect to the

functions (the address determination can be made by obtaining the address and base type of the

specified object. Using that information, a virtual function table is located for the specified

object. The determined function address is obtained as an address from the virtual function table

that maps, via a predefined address to function mapping, into the specified virtual function, col 3,

ln 31-39/ obtaining an address and base type of said specified object, using said obtained address

and base type of said specified object, locating a virtual function table for said specified object

and obtaining said determined address of a function as an address from said virtual function

table that maps, via a predefined address to function mapping, into said specified virtual

function, col 24, ln 5-11), at compile time, a compiler is to generate the table that indicate an

index for each function to be determined base on definition of class (it is the address of the

virtual function table (vtbl) for this object's class. The virtual function table is basically a list of

pointers to functions; the index into such a table for a function of any given name will be the same for all such tables and all such functions in classes participating in a derivation hierarchy whose root contains a function of that name. The virtual function table actually contains a structure in which the function pointers are embedded, col 17, ln 57-66/ The virtual function tables contain pointers to the functions for their respective class, col 12/ ln 26-30/ the table comes from a class, and contains the addresses of that class's functions. The table is generated automatically by the compiler, col 11, ln 7-11/ the virtual function table, which is created by the compiler, col 13, ln 28-31/ several classes may contain multiple functions, all of the same name f, each declared in its own class, col 16, ln 19-21/ there can be no compile-time determination of what function is intended to be called. The function that is selected for execution will be determined at run time as a function of the class of the object being pointed to, col 16, ln 27-31), the vtable G.E comprising a third pointer points to the function G1 which pointed by the first pointer of vtable G.D (both the vtable G.D and vtable G.E point to the function G1)(Note that virtual function pointer tables can share functions, col 12, ln 11-15/ Note that virtual function pointer tables can share functions. For example, note that both Sunview Window and XWindow have assigned their zeroeth slot to move, and that it ends up being the same function in both cases, col 12, 11-15/ The Fig. 8/virtual function tables contain pointers to the functions, col 12, ln 28-30).

5.   It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the teaching of Leach with Coplien to incorporate the feature of based on each type of object to select the vtable which is used during runtime to connect to the functions, a compiler is to generate the table that indicate an index for each function to be determined base

on definition of class, both the vtable G.D and vtable G.E point to the function G1 because this provides a mechanism to look at an object at run time and select the right function for execution, from among the many functions of the same name that exist as operations on classes in an inheritance hierarchy and to allow multiple objects can simultaneously have activation records open on a single given function.

6.   **As to claim 18,** Leach teaches a fifth pointer(S1::P::vfptr points , col 27, ln 55-57), an instance of interface D, the instance of interface D including a fifth pointer to point to interface vtable G.D (col 27, ln 55-57/ ln 60-62) ; and a six pointer(S1::P::vfptr points, col 27, ln 62-65), an instance of interface E, the instance of interface E including a six pointer to point to interface vtable G.E(col 27/ ln 57-57/ 62-64).

7.   **As to claim 20**, Leach teaches a fifth pointer(S1::C::m.sub.-- pS1, S1::D::m.sub.-- pS1, and S1::m.sub.—punkOuter, col 15, ln 33-38), a fifth pointer configured to point to a canonical base address for the object (col 15, ln 33-38).

8.   **Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leach US (5,745764) in view of Coplien(US 5093914 A), as applied to claim 1 above, and further in view of Hasha (US 7353271 B2).**

9.   **As to claim 19**, Leach and Coplien do not teach the pointer in the vtables allow for casting of references of an interface type into references whose type is defined by the class configured to implement the interface for that interface type. However, Hasha teaches the pointer

in the vtables allow for casting of references of an interface type into references whose type is

defined by the class configured to implement the interface for that interface type (a class

definition that implements the IShape interface, col 2, ln 29-40/To pass a reference to an object

of the Shape class, a program that invokes the routine would type cast a pointer to the object of

the Shape class to a pointer to the IShape interface. So long as the pointer points to a location

that contains the address of the virtual function table and the virtual function table contains the

entries in the specified order, the invoked routine can correctly access the virtual functions

defined by the IShape interface, col 3, ln 2-9).

10.   It would have been obvious to one of the ordinary skill in the art at the time the invention

was made to modify the teaching of Leach and Coplien with Hasha to incorporate the feature of

casting of references of an interface type into references whose type is defined by the class

configured to implement the interface for that interface type because this avoids the difficulties

of having to change class definitions when a new virtual function is added to an interface.

11.   Claim 21 is rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over

Leach US (5,745764) in view of Coplien(US 5093914 A), as applied to claim 1 above, and

further in view of   Gray (US 5371891 A).

12.   **As to claim 21**, Leach and Coplien do not explicitly teach firth pointer is at a predefined

offset from the fourth pointer. However, Gray teaches firth pointer is at a predefined offset from

the fourth pointer (the this pointer points to virtual function table pointer V::vfptr [fourth

pointer], which is a distance of dVA.sub.1, from the class address of an object of class A. Thus,

function A::f1 323 would subtract dVA.sub.1 from the this pointer to determine the location of

A::vbptr[fifth pointer], col 12, ln 9-15/ The virtual base table pointer A::vbptr contains the

address of the virtual base table 341, col 11, ln 65-66/ Virtual function table pointer V::vfptr

contains the pointer to the virtual function table 342, col 11, ln 68 to col 12, 1-2/ col 13, the this

pointer points to virtual function table pointer V::vfptr in class A, which is an offset of

dVA.sub.1 from the virtual base table pointer A::vbptr in class A ln 20-23).

13.   It would have been obvious to one of the ordinary skill in the art at the time the invention

was made to modify the teaching of Leach and Coplien with Gray to incorporate the feature of

the firth pointer is at a predefined offset from the fourth pointer this allows the function will

correctly access the virtual base table pointer in the class object.

**14.   Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leach US (
5,745764)   in view of Coplien(US 5093914 A), as applied to claim 1 above, and further in
view of   Acton (US 6209040 B1).**

15.   **As to claim 22,** Leach teaches structure has fourth pointer points a table and fifth pointer

points another table. Leach and Coplien do not teach the fifth pointer is adjacent to the fourth

pointer. However, Acton teaches the fifth pointer is adjacent to the fourth pointer (a list of

pointers 403 to the object type definitions contained in the type library. The object type

definitions are sequentially ordered starting from 0. Each pointer in the list points to an

ITypeInfo object 404, 405. Each ITypeInfo object contains the definition and binding and

loading information of one object type. Each ITypeInfo object contains a pointer to an

ITypeMembers object 406, an ITypeBind object 407, and an ITypeFixups object 408, col 6, ln

47-55/ the pointers are adjacent each other because the pointers is the list of pointers, Fig. 4).

16.   It would have been obvious to one of the ordinary skill in the art at the time the invention

was made to modify the teaching of Leach and Coplien with Acton to incorporate the feature of

the fifth pointer is adjacent to the fourth pointer because this allows searching to the structure list

for a matching entry for the virtual table pointers and provides a mechanism for defining data

members, base members for enumerators.

Response to the argument

17.   Applicant's arguments filed 12/02/2008 have been considered but are moot in view of the

new ground(s) of rejection. Applicant amended the claims; new references meet the amended

feature.

Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to LeChi Truong whose telephone number is (571) 272-3767. The

examiner can normally be reached on 8 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR of Public PAIP. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIP

system, contact the Electronic Business Center (EBC) at 866-217-9197(toll-free).

/LeChi Truong/

Examiner, Art Unit 2194

LeChi Truong

March 17, 2009